Wastewater Study

PRELIMINARY BASIS OF DESIGN REPORT

Scottsdale Residences

69th Street and E. Main Street
Scottsdale, AZ 85251

PRELIMINARY Basis of Design Report

- ☐ ACCEPTED
- ☑ ACCEPTED AS NOTED
- ☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE
SCOTTSDALE WATER
9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY ldillon **DATE** 5/6/2019

Address the following comments below and herein in the final BOD:
1) DS&PM 7-1.409, part B: Install cleanout on service line within ROW per MAG 440-3. Call out on utility plan.

2)DS&PM 7-1.409 Abandoned sewer service line needs to be removed and permanently capped at the property line. Call out on utility plan.

3) Revise combined sewer flow calculations per notes herein,

Prepared For:

C C B G
Architects, Inc.
Phoenix - San Diego
www.ccbg-arch.com

Registered Professional Engineer (Civil)
CERTIFICATE NO.
45621
ALI SAMIH
FAKIH
Date Signed 03-15-2019
ARIZONA, U. S. A.

Prepared by:

SEG

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480.588.7226 www.azSEG.com

Project Number: 180961

Date: March 15, 2019 (DRB)

Case No.: **Plan Check No.: TBD**

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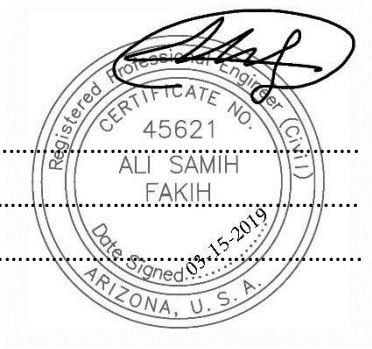


LIST OF FIGURES:

APPENDIX:

1. INTRODUCTION

1.1 SUMMARY OF PROPOSED DEVELOPMENT:

The report presents the service requirements for Scottsdale Residences located at the southeast corner of 69th Street and Main Street in Scottsdale, AZ. The proposed development consists of a new 4-story condominium building of 121 units with underground parking and a pool proposed on the second floor. The purpose of this sewer basis of design report is to provide an analysis of the impact that the redevelopment of the existing site will have on the city's sewer system. Preparation of this report has been done in accordance with the requirements of the City of Scottsdale Design Standards & Policies Manual (DS&PM) 2018 [1].

1.2 LEGAL DESCRIPTION:

The project property consists of multiple parcels of land located in a portion of the Northeast ¼ of Section 24, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Scottsdale, Arizona. The project site consists of the following parcels:

Parcel ID:
Parcel 130-11-011; Premium Administration, Zoning D/DMU-2 DO
Parcel 130-11-010; Premium Administration, Zoning D/DMU-2 DO
Parcel 130-11-009; Undeveloped, Zoning D/DMU-2 DO
Parcel 130-11-008; Undeveloped, Zoning D/DMU-2 DO
Parcel 130-11-007; Perfecta L.M.T, Zoning D/DMU-2 DO
Parcel 130-11-006; Perfecta L.M.T, Zoning D/DMU-2 DO
Parcel 130-11-005; Perfecta L.M.T, Zoning D/DMU-2 DO
Parcel 130-11-004; Perfecta L.M.T, Zoning D/DMU-2 DO
Parcel 130-11-003; Perfecta L.M.T, Zoning D/DMU-2 DO

FIGURE 1 - **Vicinity Map** for the project's location with respect to major cross streets.

1.3 EXISTING AND PROPOSED SITE ZONING AND LAND USES:

The project area includes approximately 55,408. ft. (1.27 acres) of land designated as D/DMU-2 per COS Zoning Map 19. Existing site context related to surrounding developments is as follows:

- North: To the north there are restaurants, across Main Street, with C-2 zoning.
- West: Across 69th Street there is a residential development, The Standard Apartments zoned D/DMU-2
- South: South of the adjacent alley there are multiple commercial developments, zoned C-2.
- East: To the east there is a commercial building, Prestige Cleaners, zoned C-2.

2. DESIGN DOCUMENTATION

2.1 DESIGN COMPLIANCE:

The analysis of the proposed and existing sewer system is done in compliance with Chapter 7 – Wastewater of the City of Scottsdale 2018 update of the Design Standards & Policies Manual

(DS&PM). Design flow calculations for the on-site system will be based on the recommendations in Section 7-1.403 of the DS&PM.

3. EXISTING CONDITIONS

3.1 EXISTING ZONING & LAND USE:

Land ownership includes 1.27 +/- acres of gross area per site over eight (8) parcels of developed land and one (1) parcel of undeveloped land zoned D/DMU-2.

3.2 EXISTING TOPOGRAPHY, VEGETATION AND LANDFORM FEATURES:

The site is currently developed includes two commercial developments with parking lots: Premium Administration and Perfecta L.M.T. The two developments are separated by an undeveloped parcel consisting mostly of a dirt surface.

Per Topographic Survey prepared by Survey Innovation Group Inc., the site slopes from north to south at approximately 0.50%. Elevation varies from approximately 1264.38 at the northwest corner to approximately 1262.12 at the southeast corner.

FIRM Map Number 04013C2235L dated October 16, 2013 indicates the site is designated as Zone "X". As such, it is defined as areas determined to be outside the 0.2% annual chance floodplain and therefore is not in a special flood hazard area.

Refer to **FIGURE 2** for an aerial of the overall project existing conditions.

3.3 EXISTING UTILITIES:

According to the Sanitary Sewer Quarter Section Map 16-44, there is an existing 8" sewer main that runs from west to east along the alley south of the site. The 8" sewer line begins at the entrance of the alley and runs east, through the entire length of the alley, where it ultimately connects to an existing 18" VCP sewer main running from north to south along Goldwater. Per QS Map 16-44, there are no other public sewer mains along the adjacent streets to the site, 69TH Street and Main Street.

Refer to **FIGURE 3** for the City quarter section map **(QS 16-44)**

4. PROPOSED CONDITIONS

4.1 SITE PLAN:

Proposed development consists of a new 4-story condominium. The development will include five proposed access doors to the first-floor ground parking and one ramp access to an underground parking garage on the south side of the building.

Refer to **APPENDIX III** for Preliminary Utility Plan.

4.2 PROPOSED SEWER SYSTEM:

For the purpose of this preliminary report, it is assumed that on-site sewer will consist of a 6" sewer service line connecting at the south end of the building. The sewer service line will continue south

to connect to the existing 8" sewer in the alley, south of the site. The proposed 6" service line will connect to the existing 8" main through a 6" wye.

Refer to **APPENDIX III** for Preliminary Utility Plan.

4.3 MAINTENANCE RESPONSIBILITIES:

The on-site sewer line for the proposed development will be private and maintained by the property owner. The off-site sewer is a public system owned and maintained by the City of Scottsdale.

5. SANITARY SYSTEM COMPUTATIONS

5.1. SEWER FLOW DEMANDS:

The proposed development will consist of 121 units with a pool on the second floor. The DS&PM, Chapter 7-143B- Wastewater, Figure 7.1-2 defines Average Day Sewer Demand for High Density Condominium as 140 gpd per unit and required peaking factor of 4.5. The pool requires a 100 gpm one-time backwash. As a result, the following demand calculations were summarized:

Table 1 - Sewer Demand Calculations - Proposed Conditions

Land Use	Units	Demand	Average Day Demand	Peak Factor	Peak Demand	
		(GPD/Unit)	(GPD)		(GPD)	(GPM)
Condominium	121	140	16,940	4.5	76,230	53
Pool						100
Total						**153**

5.2. VARIANCE FROM STATED DESIGN FLOWS:

Stated design flows for the on-site system will be used as recommended.

5.3. SEWER SYSTEM ANALYSIS (OFF-SITE):

South of the site there are multiple commercial developments that appear to discharge to the existing 8" sewer line along the alley. The contributing developments to the existing sewer system, have been identified as the following:

- 6902 E. 1st Street- CAJ International- Commercial
- 6920 E. 1st Street- Martori and Co.- Commercial
- 6940 E. 1st Street- Kindred Cannabis- Commercial
- 6960 E. 1st Street- Arizona Barbecue Festival Restaurant
- 6950 E. 1st Street- Alo Cafe- Restaurant
- 6938 E. 1st Street- Alis Living Lifestyle Boutique- Commercial
- 3800 N. Goldwater- Cornish Pasty Co- Restaurant

As a result, the following demand calculations were developed under proposed conditions.

Table 2 - Sewer Demand Calculations - Proposed Conditions

Land Use	Units/ Area (sf)	Demand (GPD/Unit or Area)	Average Day Demand (GPD)	Peak Factor	Peak Demand (GPD)	Peak Demand (GPM)
Condominium	121	140	16,940	4.5	76,230	53
Pool	-	-	-	-	-	100
Commercial (6902 E 1st)	2868	0.5	1,434	3	4,302	3
Commercial (6920 E 1st)	1661	0.5	831	3	2,492	2
Commercial (6940 E 1st)	2591	0.5	1,296	3	3,887	3
Restaurant (6960 E 1st)	1441	1.2	1,729	6	10,375	7
Restaurant (6950 E 1st)	1388	1.2	1,666	6	9,994	7
Commercial (6938 E 1st)	1408	0.5	704	3	2,112	1
Restaurant (3800 N Goldwater)	5257	1.2	6,308	6	37,850	26
Total			**30,908**		**147,242**	**202**

First St: 6900/690 6914 - 70 6930 - 30 6940/693 6950/690

Goldwate 3800 - 61 3908+69

6902

3300 3960 23760 6100 7320 43920 194863 235

3908 Goldwater + 6953 Main - 5300 sqft x 1.2x6= 38160

The total sewer demand calculations under proposed conditions are determined as **30,908 gpd** for average day demand and **202 gpm** for peak demand.

5.4. SEWER CAPACITY CALCULATIONS

.52% based on as-builts

235

At d/D=0.65 and with an existing slope of 0.62%, the existing 8" sewer line can convey the peak design flow of 202 GPM. The proposed 6" sewer service line at S=2% can adequately convey the proposed development's on-site peak design flow of 153 GPM.

The sewer capacities have been calculated using FlowMaster V8i. Refer to **APPENDIX II** for pipe calculation output.

6. SUMMARY

6.1 SUMMARY OF PROPOSED IMPROVEMENTS:

- The existing 8" sewer line can adequately convey the proposed development's sewer peak demand of 202 GPM.
- The proposed wastewater improvement was designed based on the current City of Scottsdale's design standards and policies.
- All new infrastructure on-site will be 6" in size and privately maintained. The 6" service line can adequately convey the onsite sewer peak demand of 153 GPM.

6.2 PROJECT SCHEDULE:

The infrastructure is proposed to be constructed in a single phase.

7 SUPPORTING MAPS

7.1 UTILITY PLANS

Refer to **APPENDIX III** for Preliminary Utility Plan**.**

8 REFERENCES

1. *COS QS Sewer Plan number 13-46*
2. *City of Scottsdale Design Standards & Policies Manual, 2018 (Chapter 7 – Wastewater)*

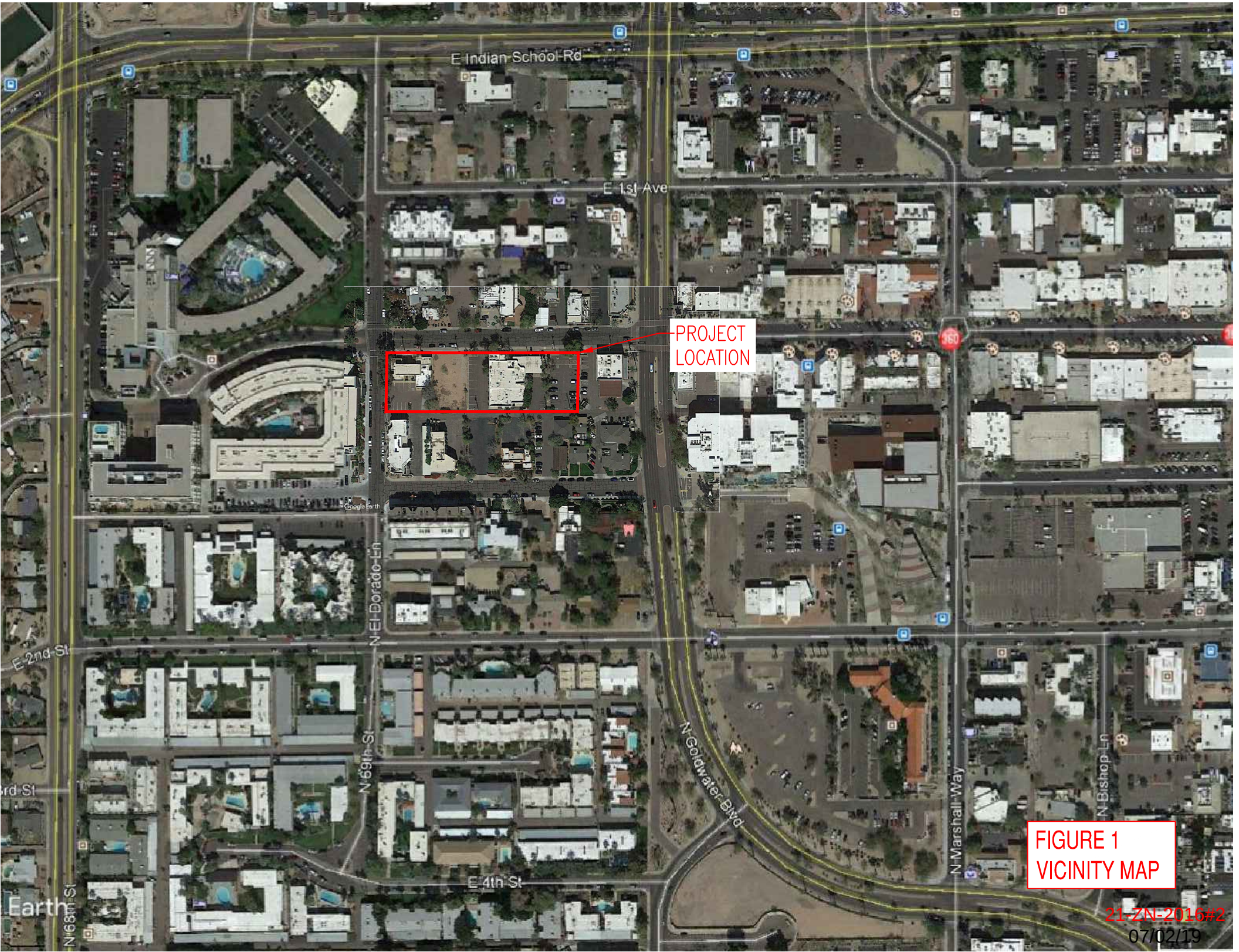
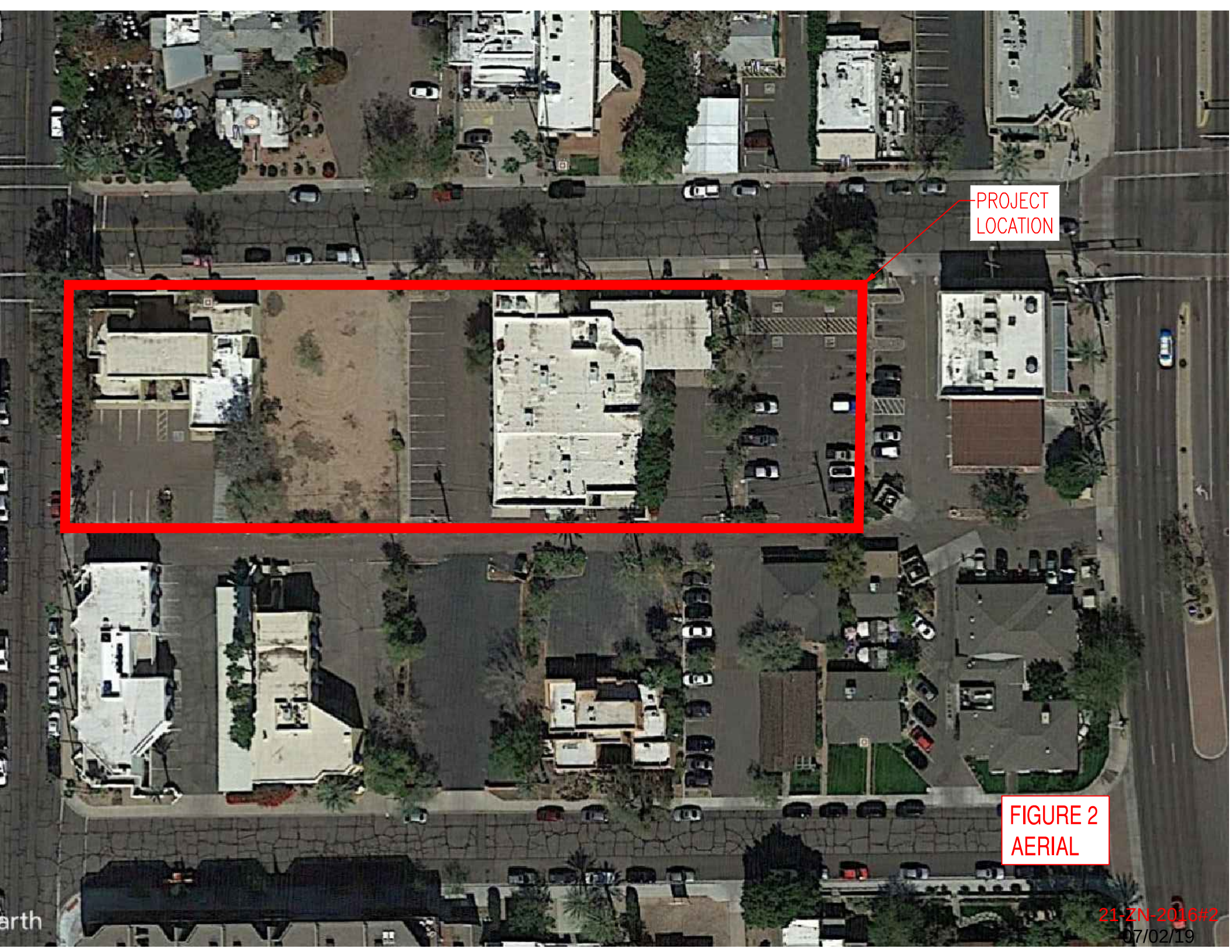


FIGURE 1
VICINITY MAP

21-ZN-2016#2
07/02/19


PROJECT
LOCATION
FIGURE 2
AERIAL
21-ZN-2016#2
07/02/19

17-44

16-43

16-45

15-44

PROJECT SITE

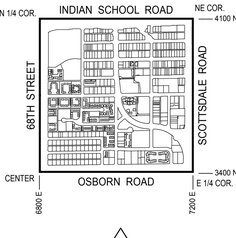
GENERAL NOTES:

- THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
- THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS 'CALCULATED' ON THE MAP.

LEGEND:

- Cleanout
- Lift Station (LS)
- Manhole
- Non-GPS Point
- Plug
- Sewer Service Point
- Sewer Tap Point
- Sewer Valve
- Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force (Force)
- Sewer Main - Private

VICINITY MAP



NORTH

SCALE: 1" = 100'

0 50 100 200

The map scale of 1" = 100' is based on a full size print of 30" x 36"

SEWER

QUARTER SECTION MAP

16-44

NE 1/4 SEC. 27 T2N R4E

FIGURE 3

CITY OF SCOTTSDALE
SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS
3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

09-DEC-18

07/02/19

APPENDIX I

Design Requirements

calculations to the Water Resources Department for permission to use extra-strength pipe, special bedding specifications, or alternative construction methods. The Water Resources Department must accept the request in writing prior to Plan Review's approval of the final plans.
Ensure that all types of pipe material used in design have established ASTM, ANSI, AWWA or NSF standards of manufacture or seals of approval and are designated for use with wastewater.

SYSTEM LAYOUT 7-1.402

Generally, SS lines constructed along a street grid should be aligned parallel to, and south or west of the street centerline. Lines should not cross the street centerline except in cases where curvilinear roadway alignments are encountered.
Public SS lines within commercial, industrial or multi-family developments must be located within drive aisles a minimum of 6 feet from any structure. Public SS lines will be located within tracts and/or sewer line easements. No private utilities are allowed longitudinally within a sewer line easement.
Curvilinear SS lines are not allowed. Developments with numerous curved streets should be discussed with the Water Resources Department to decide whether the city will consider a design report with water and sewer layouts in accordance with the following criteria:

A. Water and SS lines will be placed under the paved section of the roadway within the area, from back-of-curb to back-of-curb.
B. SS lines must maintain a minimum of 6-feet horizontal clearance to dry utilities per COS Standard Detail No. 2401.
C. SS manholes are to be located at the approximate center of the drive lane.
D. The water line and SS line shall run parallel to each other with 6 feet of separation between the pipe walls. Lines may cross the street centerline.
E. Deflections in the SS line through manholes shall be designed to nominal fitting angles within standard tolerances and will occur at the same locations where the water line is deflected. Refer to Section 6-1.402 for related water system criteria.

DESIGN FLOWS 7-1.403

A. **Residential**
SS lines 8 to 12 inches in diameter will be designed using 100 gallons per capita per day (gpcpd) and a peaking factor of 4.
SS lines larger than 12 inches in diameter will be designed using 105 gpcpd and a peaking factor developed from "Harmon's Formula":
Qmax = Qavg x [1+ (14 / (4+P1/2))]
P = Population / 1,000
Residential densities are to assume 2.5 persons per dwelling unit. Multifamily densities exceeding 22 dwelling units per acre can assume 1.7 to 2.2 persons per unit.

B. **Commercial and Industrial**
Wastewater flows for uses other than those listed below shall be based upon known regional or accepted engineering reference sources approved by the Water Resources Department.

LAND USE	DEMAND (gpd)	DESIGN PEAKING FACTOR
Commercial/Retail	0.5 per sq. ft.	3
Office	0.4 per sq. ft.	3
Restaurant	1.2 per sq. ft.	6
High Density Condominium (Condo)	140 per unit	4.5
Resort Hotel (includes site amenities)	380 per room.	4.5
School: without cafeteria	30 per student	6
School: with cafeteria	50 per student	6
Cultural	0.1 per sq. ft.	3
Clubhouse for Subdivision Golf Course	100 per patron x 2 patrons per du per day	4.5
Fitness Center/ Spa/ Health club	0.8 per sq. ft.	3.5

FIGURE 7-1.2 AVERAGE DAY SEWER DEMAND IN GALLONS PER DAY & PEAKING FACTORS BY LAND USE

HYDRAULIC DESIGN 7-1.404

No public SS lines will be less than 8 inches in diameter unless permission is received in writing from the Water Resources Department.

SS lines shall be designed and constructed to give mean full flow velocities equal to or greater than 2.5 fps, based upon Manning's Formula, using an "n" value of 0.013.

To prevent abrasion and erosion of the pipe material, the maximum velocity will be limited to 10 fps at estimated peak flow. Where velocities exceed this maximum figure, submit a hydraulic analysis along with construction recommendations to the Water Resources Department for consideration. In no case will velocities greater than 15 fps be allowed.

Actual velocities shall be analyzed for minimum, average day and peak day design flow conditions for each reach of pipe.

The SS system shall be designed to achieve uniform flow velocities through consistent slopes. Abrupt changes in slope shall be evaluated for hydraulic jump.

The depth to diameter ratio (d/D) for gravity SS pipes 12 inches in diameter and less shall not exceed 0.65 in the ultimate peak flow condition. This d/D ratio includes an allowance for system infiltration and inflow.

The d/D for gravity drains greater than 12 inches diameter shall not exceed 0.70 for the ultimate peak flow condition. This d/D includes an allowance for system infiltration and inflow.

Measures to mitigate hydrogen sulfide shall be analyzed at manhole drops, abrupt changes in pipe slope or direction and at changes in pipe diameter.

MANHOLES AND CLEAN OUTS 7-1.405

Manholes in city streets shall be located near the center of the inside traffic lane, rather than on or near the line separating traffic lanes. Manholes shall not be in bike trails, equestrian trails, sidewalks, crosswalks or wash crossings. Manholes are required at all

APPENDIX II

Calculations

Worksheet for 8" Sewer @ S=0.62%; d/D=0.65

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00620	ft/ft
Diameter	0.67	ft
Discharge	202.00	gal/min

Results

Normal Depth	0.32	ft
Flow Area	0.17	ft²
Wetted Perimeter	1.03	ft
Hydraulic Radius	0.16	ft
Top Width	0.67	ft
Critical Depth	0.31	ft
Percent Full	48.0	%
Critical Slope	0.00683	ft/ft
Velocity	2.69	ft/s
Velocity Head	0.11	ft
Specific Energy	0.43	ft
Froude Number	0.95	
Maximum Discharge	1.04	ft³/s
Discharge Full	0.96	ft³/s
Slope Full	0.00135	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	48.02	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8" Sewer @ S=0.62%; d/D=0.65

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	0.31	ft
Channel Slope	0.00620	ft/ft
Critical Slope	0.00683	ft/ft

Worksheet for 6" Sewer @ S=2.00%; d/D=0.65

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.02000	ft/ft
Diameter	0.50	ft
Discharge	153.00	gal/min

Results

Normal Depth	0.23	ft
Flow Area	0.09	ft^2
Wetted Perimeter	0.74	ft
Hydraulic Radius	0.12	ft
Top Width	0.50	ft
Critical Depth	0.30	ft
Percent Full	45.8	%
Critical Slope	0.00852	ft/ft
Velocity	3.89	ft/s
Velocity Head	0.24	ft
Specific Energy	0.46	ft
Froude Number	1.64	
Maximum Discharge	0.85	ft^3/s
Discharge Full	0.79	ft^3/s
Slope Full	0.00369	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	45.78	%
Downstream Velocity	Infinity	ft/s

Worksheet for 6" Sewer @ S=2.00%; d/D=0.65

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.23	ft
Critical Depth	0.30	ft
Channel Slope	0.02000	ft/ft
Critical Slope	0.00852	ft/ft

APPENDIX III

Preliminary Utility Plan

CIVIL ENGINEER:
SEG
8280 E. GELDING DR, SUITE #101
SCOTTSDALE, AZ 85260
480-588-7226
ATTN: ALI FAKIH

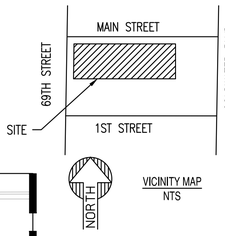
DEVELOPER:
CCBG ARCHITECTS, INC
102 EAST BUCHANAN ST.
PHOENIX, AZ 85004
602-663-3095
ATTN: PAUL LADENSACK

OWNER:
MAIN STREET SCOTTSDALE, LLLP
1401 17TH STREET, SUITE 700
DENVER, CO 80202

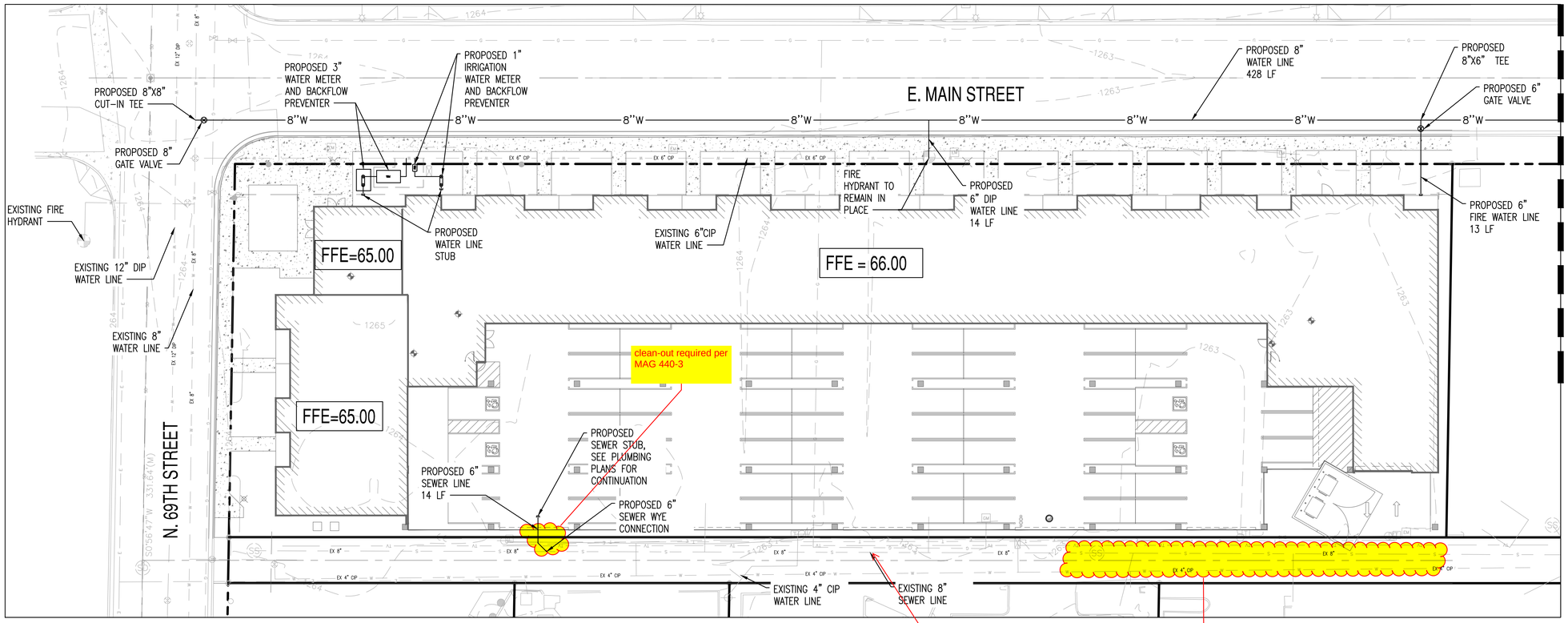
MAIN STREET AND 69TH STREET

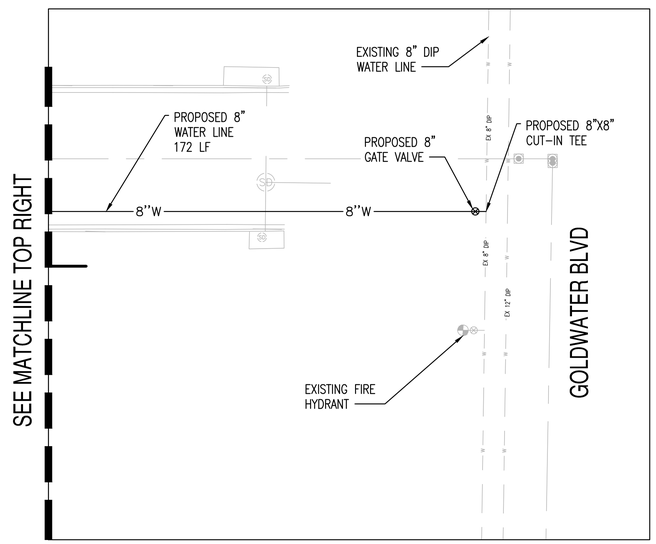
PRELIMINARY GRADING PLAN

REFER TO WATER BOD FOR COMMENTS RELEVANT TO WATER ITEMS SHOWN HERE



VICINITY MAP
NTS





abandon existing sewer stubs not being used by proposed development per DSPM. Illustrate accordingly on utility plan

130ft of existing water main too close to sewer 6ft clear required (6.5ft CL to CL). Resolve.

LEGEND

- PROPERTY LINE
- EXISTING WATER LINE
- 6"W — PROPOSED WATER LINE
- EXISTING SEWER LINE
- 6"S — PROPOSED SEWER LINE
- PROPOSED EASEMENT
- EXISTING FIRE HYDRANT
- EXISTING SEWER MANHOLE
- EXISTING SEWER CLEANOUT
- WM — WATER METER
- BACKFLOW PREVENTER
- WATER VALVE

NORTH

0' 20' 40' 60'

SCALE: 1" = 20'

Call at least two full working days before you begin excavation. ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

PRELIMINARY
NOT FOR
CONSTRUCTION

SEG
8280 E. GELDING DR #101, SCOTTSDALE, ARIZONA 85260
WWW. AZSEG.COM TEL: 480.588.7226

PROJECT: SCOTTSDALE RESIDENCES

LOCATION: 69TH STREET AND E. MAIN STREET, SCOTTSDALE, AZ

DRAWN	AVINA
DESIGNED	AVINA
CHECKED	COUNSELL
PROJ. MGR.	FAKIH

DATE: 03/15/2019

ISSUED FOR: PRELIMINARY DESIGN

REVISION NO.:	DATE:
1	
2	
3	
4	

JOB NO.: 181205

SHEET TITLE: PRELIMINARY UTILITY PLAN

SHEET NO.: C4.00

X:\PROJECTS\CCBG ARCHITECTURE\CCBG MAIN & 69TH STREET 181205\11 CAD (SEG)\11.2 ENTITLEMENT-PLANNING\181205-PRELIMINARY UTILITY.DWG

21-ZN-2016#2
07/02/19